



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,567	08/27/2001	Pamela S. Trammel	LWM-A110	5034

7590                  04/03/2003

WAGNER, MURABITO & HAO LLP  
Third Floor  
Two North Market Street  
San Jose, CA 95113

[REDACTED]  
EXAMINER

VOCKRODT, JEFF B

[REDACTED]  
ART UNIT                  PAPER NUMBER

2822

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

<b>Application No.</b> 09/940,567  <b>Examiner</b> Jeff Vockrodt	<b>Applicant(s)</b> TRAMMEL ET AL.	
--	---------------------------------------	--

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1) Responsive to communication(s) filed on 21 January 2003.

2a) This action is FINAL.                  2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

4) Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) 9-22 is/are allowed.

6) Claim(s) 1,2,4,7 and 8 is/are rejected.

7) Claim(s) 3,5 and 6 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
 If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
 a)  The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.                  4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other:

**DETAILED ACTION**

This office action is in response to the amendment filed on January 21, 2003. Claims 1-22 are pending.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-2, 4, and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,507,681 ("Kowalczyk") in view of WO 01/06547 ("Huttemann").**

**Claim 1 corresponds to Kowalczyk as follows (with the differences underlined):** A method for making a resistive heater for a planar lightwave circuit, the method comprising the steps of: a) depositing a resistive layer (heater 660; Fig. 6) on a top clad of a planar lightwave circuit (cladding layer 620); b) depositing an interconnect layer (layer for contact stripes 662) onto the resistive layer (660) (both the heater layer 660 and the contact stripes layer 662 are deposited before being patterned as they are deposited "in the same pumpdown" col. 10, ll. 20-26); c) etching the interconnect layer to define a heater interconnect, wherein the heater interconnect is disposed over the resistive layer and has a first width (Kowalczyk first etches the interconnect layer and the resistive layer in a single step--this meets clause c because of the open-ended nature (i.e., "comprising" transitional phrase) of the claim; col. 10, ll. 27-41); d) masking the heater interconnect (the second photoresist is applied over the interconnect; col. 10, 41-47); and e) etching the resistive layer to define a resistive heater, wherein the resistive

heater is disposed beneath the heater interconnect<sup>1</sup> and has a second width (width is taken along the axis that intersects both resistor contacts) larger than the first width.

Clause (e) is interpreted to impose order on the method steps such that the steps in clause (c) and (e) must be performed in their written order to be anticipated.<sup>2</sup> That is, claim 1 requires etching the contacts before patterning and etching the resistor. Kowalczyk differs in this aspect by etching the resistive layer and then etching the contacts to form the resistor shown in Fig. 6.

Huttemann teaches a thin film resistor that is patterned by etching the contacts (920,930; Fig. 10) followed by etching the resistor material (810, 1120; compare Figs. 10-11). Huttemann teaches that this manner of patterning can provide self-alignment (page 13, lines 17-25).

Kowalczyk and Huttemann are analogous art as they both concern forming thin film resistors.

It would have been obvious to one of ordinary skill in the art at the time of the invention to form the thin film resistor by patterning the contacts and then the resistor material in Kowalczyk. One of ordinary skill in the art would have been motivated to do this by Huttemann's teaching that self alignment is possible with this sequence.

Claim 2. The heater or resistive element is between a first and second contact pad, and current flows through the resistive element.

Claim 4. As discussed above, Huttemann teaches self-alignment.

---

<sup>1</sup> Kowalczyk teaches both etching the resistive layer and a resistive heater disposed beneath the heater interconnect, but as will be discussed in more detail below, does not fully meet clause (e) of claim 1 as a whole.

<sup>2</sup> While the steps recited in method claims need not necessarily be performed in their written order, claim 1 implicitly requires performing the step of clause (e) subsequent to the step of clause (c) since clause (e) refers to the "heater interconnect" that is defined in clause (c). See Loral Fairchild Corp. v. Sony Electronics Corp., 181 F.3d 1313, 1321, 50 USPQ2d 1865, 1870 (Fed. Cir. 1999) (holding that the claim language itself indicated that the claim steps had to be performed in their written order because the second step required the alignment of a second structure with a first structure formed by the prior step.).

Claims 7-8. Kowalczyk teaches etching the resistive layer using a plasma etcher which suggests a reactive ion etching process.

***Allowable Subject Matter***

Claims 9-22 are allowed. Claims 3, 5, and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3 and 9-22 differ from Kowalczyk and Huttemann taken together by requiring in addition to the steps of claim 1, including the sequence of etching the interconnect layer . . . masking the heater interconnect . . . and etching the resistive layer, wherein the resistive layer comprises tungsten and the interconnect layer comprises aluminum. In contrast, Huttemann teaches a contact pad of Ti/Pt and a resistive layer of Ta<sub>2</sub>N or NiCr; and Kowalczyk teaches a contact pad of Au and a resistive layer of NiCr. Accordingly, none of the references of record taken alone or in combination with each other teach the sequence and materials required by claims 3 and 9-22.

Claims 5-6 differ from Kowalczyk and Huttemann taken together by requiring in addition to the steps of claim 1, including the sequence of etching the interconnect layer . . . masking the heater interconnect . . . and etching the resistive layer, etching the interconnect layer using a dry etch process. In contrast, Huttemann teaches a wet etching process for patterning the Ti/Pt layer and Kowalczyk teaches a "standard commercial gold etch," which is a wet etch. Accordingly, none of the references of record taken alone or in combination with each other teach the sequence and materials required by claims 5-6.

***Response to Arguments***

Applicant's arguments with respect to claims 1-22 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 6,424,755 ("Clapp"). Clapp teaches a method for making a resistive heater (Fig. 3) for a planar lightwave circuit, the method comprising the steps of: (a) depositing a resistive layer (34) on a top clad (33) of a planar lightwave circuit (31, 32, 33); (b) depositing an interconnect layer (35) onto the resistive layer (34). Like Kowalczyk, which is applied above, Clapp does not teach etching the interconnect layer and then etching the resistive layer as required by the claims.

U.S. Pat. No. 6,285,542 ("Kennedy"). Kennedy teaches a method of forming a thin film resistor that involves patterning and etching the resistive layer after patterning and etching the interconnect layer (Figs. 7-9).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning communications from the examiner should be directed to Jeff Vockrodt at (703) 306-9144 who can be reached on weekdays from 9:30 am to 5:00 pm EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached at (703) 308-4905.

The fax numbers for this Group are (703) 305-3432, (703) 308-7722, (703) 305-3431, and (703) 308-7724. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-0956.

March 31, 2003

J. Vockrodt



AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800